

## Chapter 5

# Examining Motivational Factors in Serious Educational Games

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### ABSTRACT

*One of the assumptions in promoting serious educational games is that such engagements are playable and enjoyable. The social cognitive research has already generated and tested a number of motivational theories and models. To advance both theoretical developments and empirical research into serious educational games, it is beneficial to examine the relevant motivational factors from existing social cognitive perspectives. Although there have been some studies in the field of simulations and games reporting elevated self-efficacy and reduced learner anxiety under certain circumstances, it is important to conduct systematic research to examine learner motivation in the context of educational games and select appropriate tools for checking motivational elements in instructional design.*

### INTRODUCTION

It is widely accepted that meaningful learning is associated with motivation. It is also widely assumed that learning will eventuate if the process is fun. The English philosopher John Locke (1968) once said, more than 300 years ago, that it would be desirable to make learning a play or recreational activity rather than an assigned task or a have-to-do business. In other cultural settings, this educational “fancy” was also favored and regarded as one of the learning

principles. For instance, in the Analects of ancient Oriental educationist Confucius (Leys, 1997), it was proclaimed that students should immensely enjoy their learning by pursuing, reviewing, and applying knowledge. What Confucius and Locke proposed is perhaps the ultimate goal of all dedicated educators and learners. In an era that is characterized by the advancement of information technology and proliferation of educational software, are we getting nearer to that goal? More specifically, can serious educational games, often presented as digital multimedia environments, contribute to fostering users’ enjoyment as well as achievement?

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As Mayer (2005) points out, there are two perspectives on the relation between new technology and education. The technology-centered approach focuses on how to use all the capabilities of a cutting-edge technology in classroom learning, homework, and self-study. For example, it was thought in the 1920s that the then emerging technology—motion pictures—would be widely used in schools (which was done) and thus would eventually replace a considerably large proportion of textbooks (which did not eventuate). Likewise, television was later considered an advanced means to provide distant or convenient education. Mayer (2005) suggests that we should learn a lesson from the modern history of introducing new technology to education and adopt a different perspective: the learner-centered approach. Such an approach, according to Mayer (2005), focuses “on using multimedia technology as an aid to human cognition” (p. 9). During the recent decade, researchers have conducted a number of experiments and field studies in the cognitive processes associated with the usage of educational technology. Consequently, this line of research has offered a number of evidence-based cognitive principles for instructional design.

However, as Martens (2006) comments, it appears that another important aspect of the learner-centered approach—motivational research in the use of educational technology—deserves more attention. For example, in *The Cambridge Handbook of Multimedia Learning* edited by Mayer (2005), there are at least two chapters about gaming, simulation, microworlds, and virtual reality (Cobb & Fraser, 2005; Rieber, 2005), but none of them discuss motivational aspects. There are also three other chapters in this comprehensive handbook that deal with learning in advanced computer-based contexts, such as using animation, hypermedia, and other techniques in e-courses (Clark, 2005; Dillon & Jobst, 2005; Moreno, 2005), but only one of them has touched on a motivation-related phenomenon (Moreno, 2005). In her chapter, she describes an

agent-based environmental science game where students using an animated agent with a personalized style (i.e., game information being presented in the first and second person) exhibited better learning outcomes than their counterparts who received content explanations in a neutral style (i.e., in the third person). Martens (2006) suggests that researchers consider intrinsic motivation as an indispensable aspect in effective learning. The motivational variables involved in digital learning programs, such as computer games designed for a particular course, need to be addressed.

Although public opinions regarding educational games are divided and systematic research in motivational aspects of educational games is still sparse, there are at least six well-founded indicators of the potential for educational games to promote motivation (e.g., Garris, Ahlers, & Driskell, 2002; Malone, 1981; Thomas & Macredie, 1994). First, instructional games are usually interactive and thus engage players in the processes of rapid reaction and timely feedback. Second, games that match players’ levels are often challenging enough to grab their attention, yet the playing process does not raise too much learning anxiety (except in pathological cases) because players know there will be no real severely negative consequences (i.e., real-world punishment) if they “lose.” Third, the nonthreatening aspect of games enhances players’ (especially young children’s) fantasy in gaming, which can result in curiosity, enjoyment, and satisfaction. Fourth, the sensory stimuli (visual, auditory, kinetic, etc.) and manual involvement can send strong signals to the central nervous system and thus strengthen learners’ mental activities and persistence. Fifth, most educational games permit players to have a certain degree of control over their processes so that they can set up achievable goals according to their own judgment and the rules of games. Sixth, some types of educational games allow students to design their own games or choose a character to be personally and temporarily attached to, providing learners with a sense of “ownership”

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